How Do You Test an IT Service?

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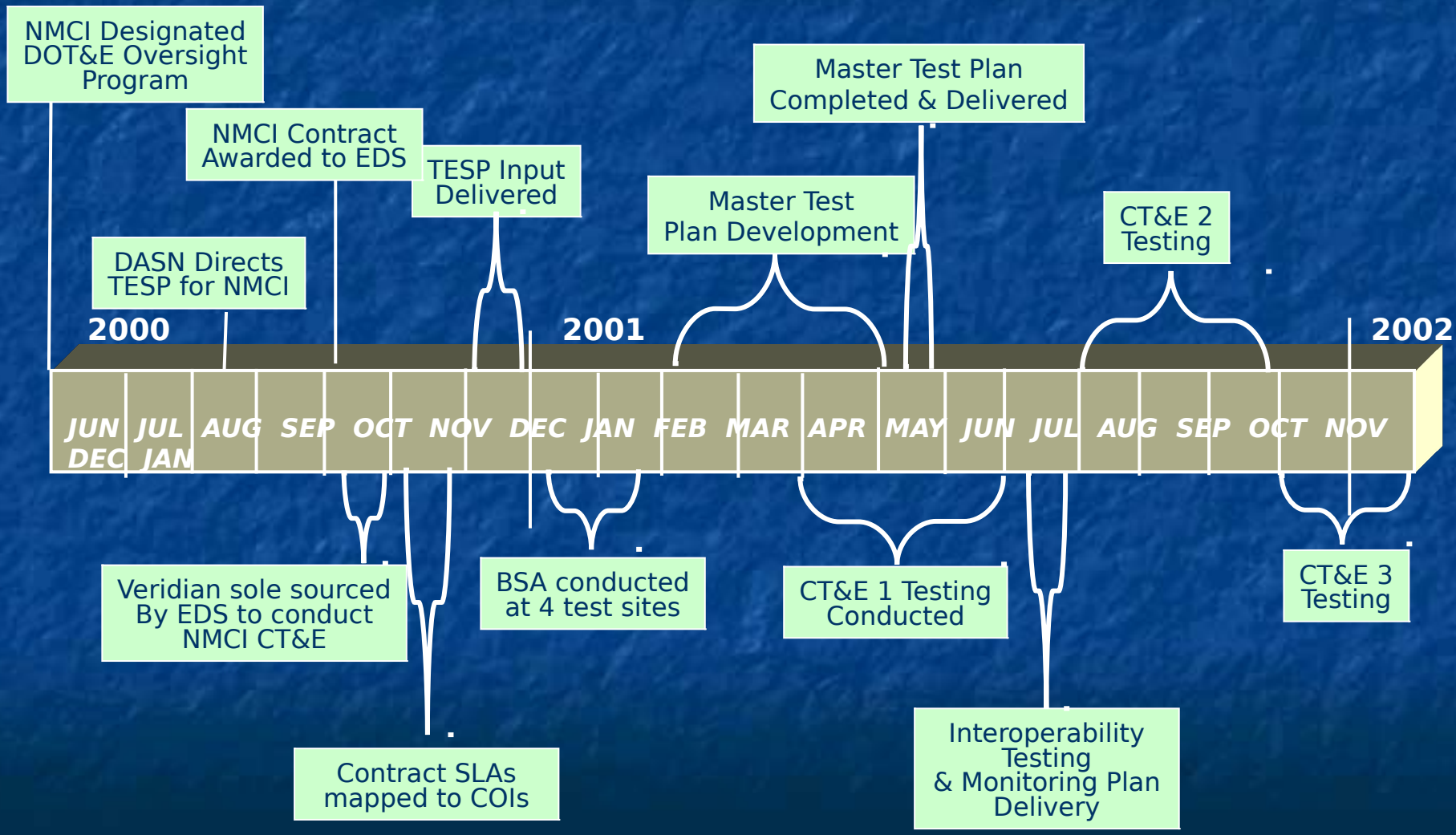
Purpose

- Explore evolving influence of IT systems and services on weapons systems
- Increasing complexity of testing
- Our experience foundation is in NMCI
- Foci are the test processes

How Did We Get Here?


NMCI Designated DOT&E Oversight Program
NMCI Contract Awarded to EDS
TESP Input Delivered
DASN Directs TESP for NMCI
Master Test Plan Completed & Delivered
Master Test Plan Development
CT&E 2 Testing
2000
2001
2002
JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN
Veridian sole sourced By EDS to conduct NMCI CT&E
BSA conducted at 4 test sites
CT&E 1 Testing Conducted
CT&E 3 Testing
Contract SLAs mapped to COIs
Interoperability Testing & Monitoring Plan Delivery

Rolling In

- Compressed Schedule
- No Traditional Program Documentation
- Our Response Based on 4-step Test Process
- Build Up (Crawl, Walk, Run)
- Concentric Testing
- Familiar Fundamentals
  - Faces
  - Processes

Test Approach

- BSA
- Phased Testing
  - CTE1 - DT (lab, bench)
  - CTE2 - DT (networks)
  - CTE3 - DT/OT (operational vignettes)
  - OPEVAL - OT
- SLA based - derived CTPs, COIs,

Test Approach

NMCI OPERATIONAL REQUIREMENTS		SECURITY	INTEROPERABILITY & RELIABILITY						NETWORK OPERATIONS & MAINTENANCE					
NMCI MEASURES OF EFFECTIVENESS		Electronic Survivability	Average Availability	Configuration Integrity	Data Integrity	Network Delays	Application Delays	Interoperability	Reconfigurability	Customer Satisfaction	Help Desk Support	Technology Insertion Latency	Recovery Latency	Security Report Latency
NMCI SERVICE LEVEL AGREEMENTS		**USER UPGRADES**												
1	Desktop Hardware and Operating System		2					3	1		3	2		
		END USER SERVICES												
3	E-mail Services		1				3	4			2			
4	Directory Services		1				2,3	4,5,6						
10	NMCI Intranet Performance		1			2		3			4			
12	Internet Access		1					2		3				
15	Moves, Adds, and Changes								1,2,4	5				
		MAINTENANCE & HELP DESK SERVICES												
23	Basic Help Desk Services										1,2,3,4,5,6,7			
		COMMUNICATIONS SERVICES												
25	BAN/LAN Communications Services		1,3			2				6			4	
		INFORMATION ASSURANCE												
33	NMCI Security Operational Services General	4,5,6		9	7,8									
36	NMCI Security Planning Services													1,2,4

Test Approach

COIs		Effectiveness COIs															Suitability COI's									
		Information Assurance				Network Performance		Scalability		Customer Service & Support			Network Support		Interoperability	Misson Support	Reliability	Maintainability	Operational Availability	Logistics Supportability	Compatability	Training & Sea-Shore Rotation		Human Factors	Safety	Documentation
SLAs		Physical Survivability	Electronic Survivability	Configuration Integrity	Data Integrity	Network Delays	Application Delays	Reconfigurability	Geographic Expandability	Customer Satisfaction	Help Desk Support	Technology Insertion Latency	Recovery Latency	Security Report Latency								Execution	Effectiveness			
Test #		E-1A	E-1B	E-1C	E-1D	E-2A	E-2B	E-3A	E-3B	E-4A	E-4B	E-4C	E-5A	E-5B	E-6	E-7	S-1	S-2	S-3	S-4	S-5	S-6A	S-6B	S-7	S-8	S-9
User Upgrades																										
1	Desktop Hardware and Operating System							1		4	3	2			3				2	3,3A	Obs/Sur		Obs/Sur	Obs/Sur	Obs/Sur	Obs/Sur
End User Services																										
2	Standard Office Automation Software							1		1,4		2			3	3,4							Obs/Sur			Obs/Sur
3	E-mail Services		Obs/Sur				3			5	2				4				1				Obs/Sur			Obs/Sur
4	Directory Services		Obs/Sur	4	5		2,3		6	7					4,5,6				1				Obs/Sur			Obs/Sur
5	File Shared Services				2	4,5				6									1,3				Obs/Sur			Obs/Sur
6	Web Access Services						2			4					3				1				Obs/Sur			Obs/Sur
7	Newsgroup Services						3			5					2,4				1				Obs/Sur			Obs/Sur
9	Print Services									4									1,2,3				Obs/Sur	2,3		Obs/Sur
10	NMCI Intranet Performance	Obs/Sur				2				5			4		3				1							
11	NIPRNET Access	Obs/Sur				2				4					3				1							
12	Internet Access	Obs/Sur								3					2				1							
13	Mainframe Access									3					2				1							
14	Desktop Access to Government Apps									3					2	1,2			1							
15	Moves, Adds, and Changes							1,2,4		3,5																
16	Software Distribution and Upgrades			1,3						1,4		2,3			4				2	1,2,3						
17	User Training																					1,2,3	4			Obs/Sur
18	Unclassified Remote Access					3				5					4				1,2				Obs/Sur			Obs/Sur
19	Classified Remote Access					3				5					4				1,2				Obs/Sur			Obs/Sur
20	Portable Workstation Wireless Dial-in									3									1	1			Obs/Sur			Obs/Sur
20A	Organizational Messaging Services									4	2				3				1				Obs/Sur			Obs/Sur
21	Desktop VTC (hardware & software)				2					6		3			5				1,4,7							Obs/Sur
22	Voice Communications	Obs/Sur				2,5,6,9				11	8		7		10				1,3,4	7			Obs/Sur			Obs/Sur
22A	Voice Mail									4					3				1,2				Obs/Sur			Obs/Sur
Maintenance and Help Desk Services																										
23	Basic Help Desk Services									3	1,2,4,5,6,7												Obs/Sur			Obs/Sur

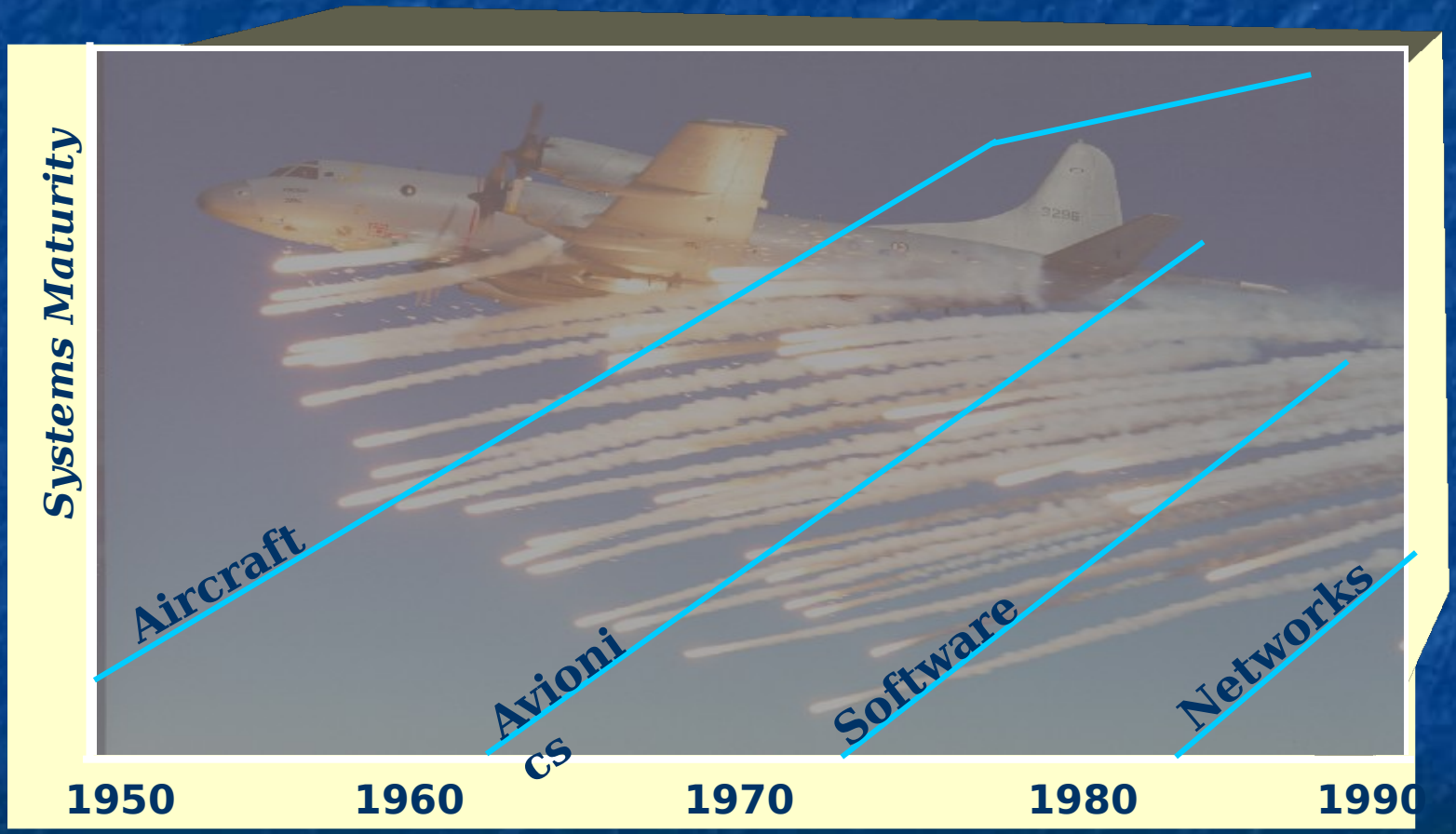
IT Testing

- Similar to Early Aviation Testing
  - How fast can you go?
  - How high can you go?
- OSI layer 1-3 centric
  - Parameter focus

IT T&E and the OSI 7-Layer Model

Where We need to be	**Mission Based**	*"Is This System Effective and Suitable?"*	**Application**	**7**
			Presentation	**6**
			Session	**5**
			Transport	**4**
Present Commerci IT Testing	**Parametric**	*"How Fast Can This Car Go?"*	**Network**	**3**
			Data Link	**2**
			Physical	**1**

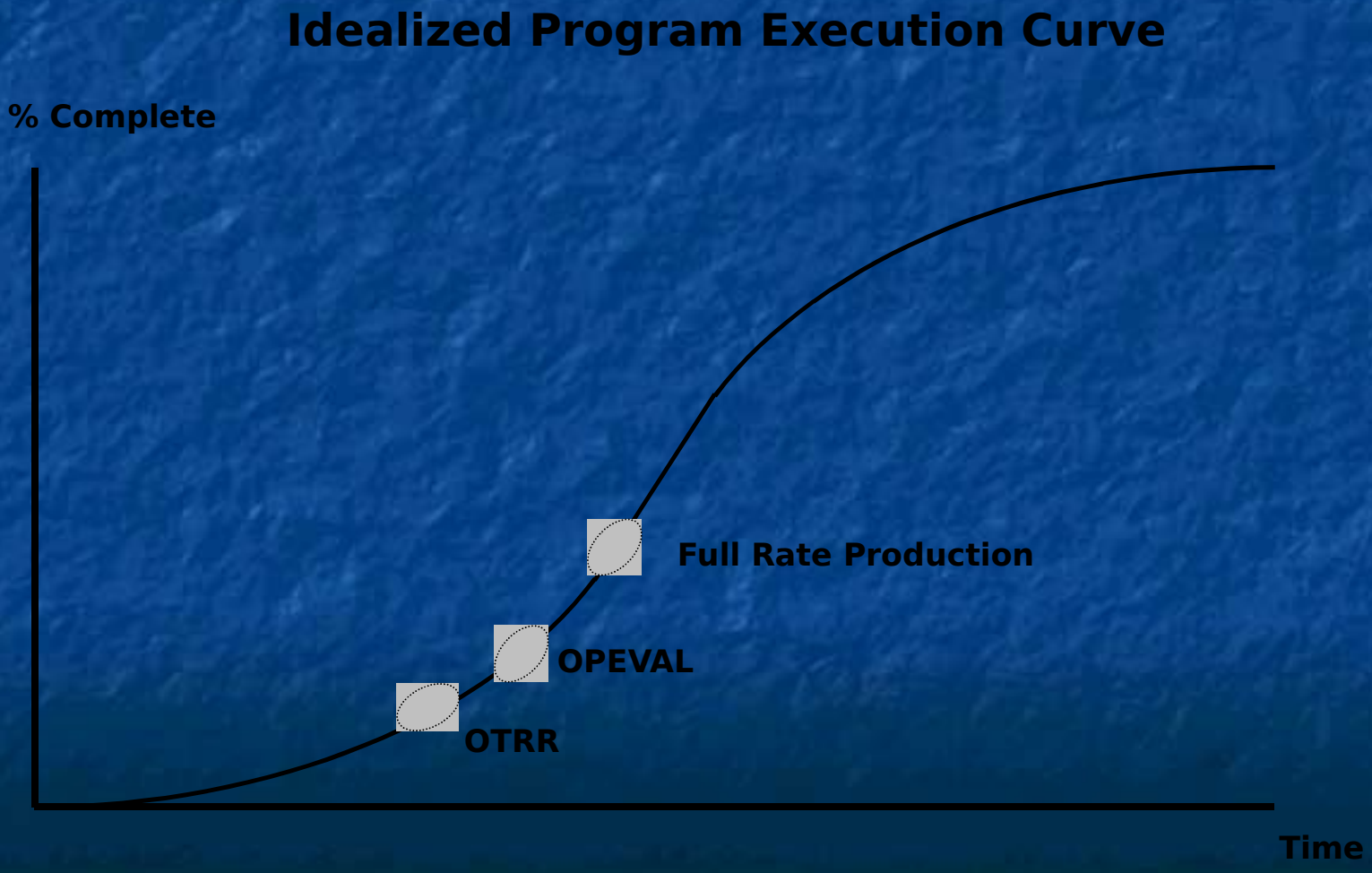
Product Line Maturity



C4I Testing

- Success of testing tied to maturity of program execution
- OTRR
- Schedule Constraints
- IP systems generate lots of data
- Program Execution curve is fractal
  - Processes on critical path provide 1st order approximation
- Use of surveys
- A_o

Testing and Program Execution



Test Issues

- NMCI equal to or better than legacy networks
- Critical path processes
  - Seat cutover
  - Legacy applications
- SLAs to COIs not a reversible function
- Operationalizing the metrics
- Early and combined CT/OT to minimize risk

Baseline System Assessment

- Innovative contract vehicle
- Lack of traditional documentation
- Needed to measure the performance of the legacy systems for comparison with NMCI

BSA Tools

- AMP
- NetIQ
- MIB scripts
- Help Desk Logs
- BelManage
- Surveys
  - End user
  - CIO and IT professionals
  - Information Assurance
- Use same tools and processes for OPEVAL

BSA Lessons Learned

- Configuration management is historical
- Good management makes an immediate impact
  - Firewalls and IDS
  - Routers
  - Connectivity
- Legacy applications

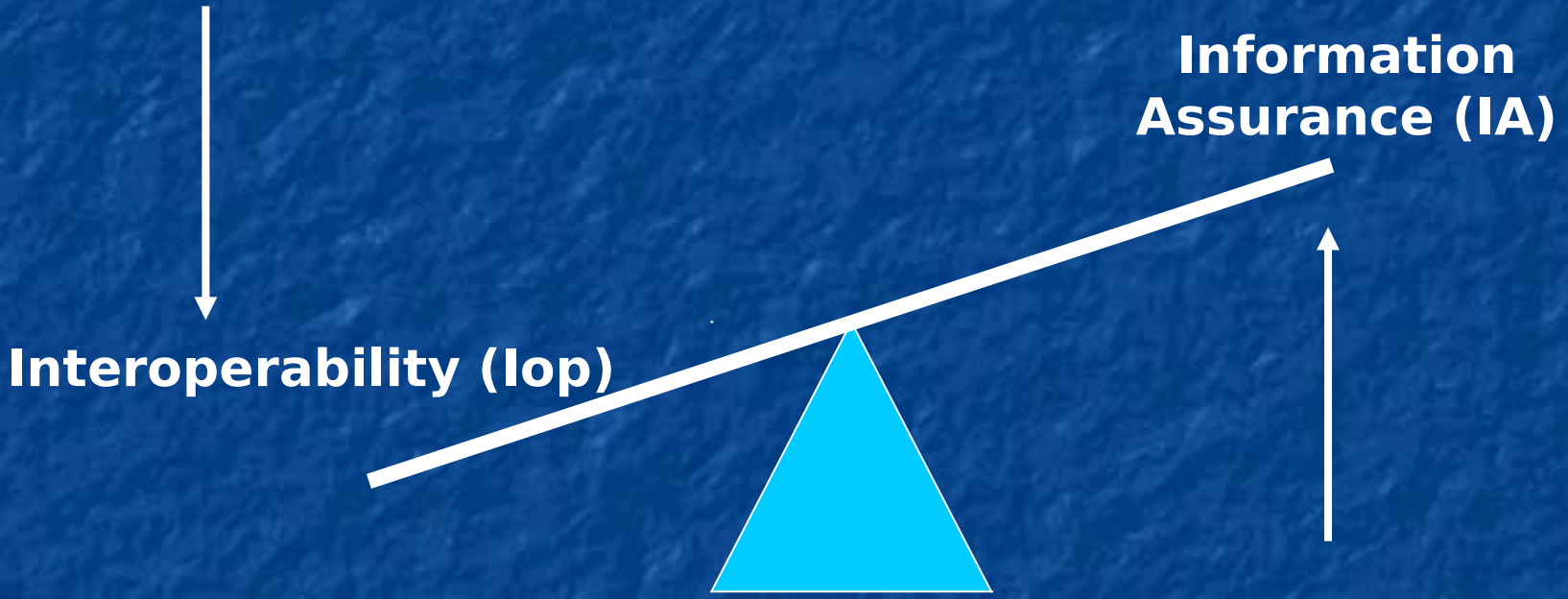
TESP Process

- Similar to a TEMP
  - More responsive
  - If it was not necessary, it was not included
  - If it was necessary, it was tailored to NMCI
- From blank sheet to approval in under 11 months
- Represented a strategy for success for NMCI

The State of IT Testing Today

- Operational assessments of interoperability and information assurance in fielded systems
- Inverse correlation of interoperability and information assurance
- Mission Thread Analysis
- Blue, Green, and Red Teams
- Common Toolkits
- Information Operations Threat Capabilities Summaries
- Feedback and feed forward

Interoperability vs. Information Assurance: A Complex Challenge

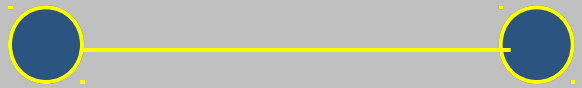


$$Iop(a^x) \underline{\quad} b^y$$
$$IA$$

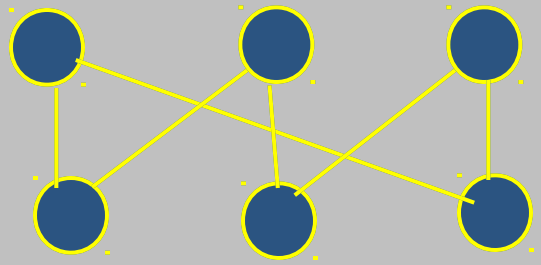
An Enterprise System Needs to Balance Iop and IA

Testing Frameworks

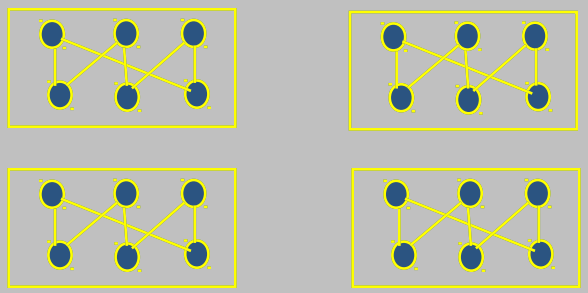
Device Testing



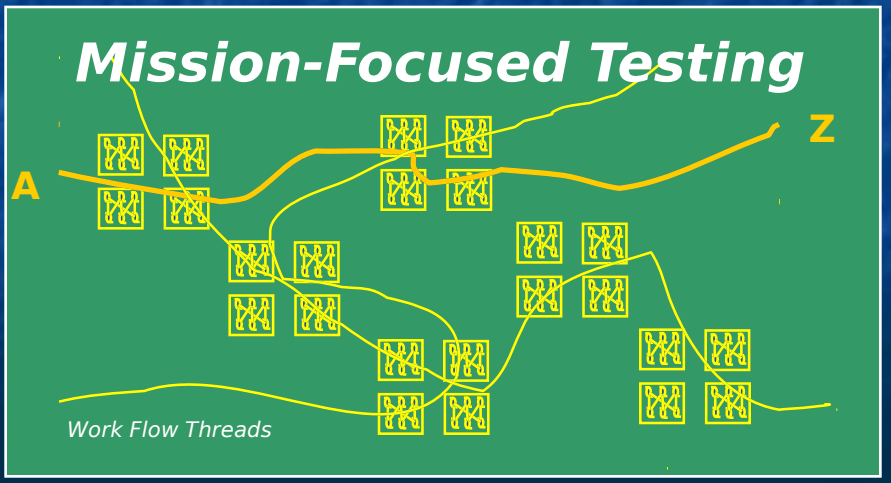
System Testing



System of Systems Testing

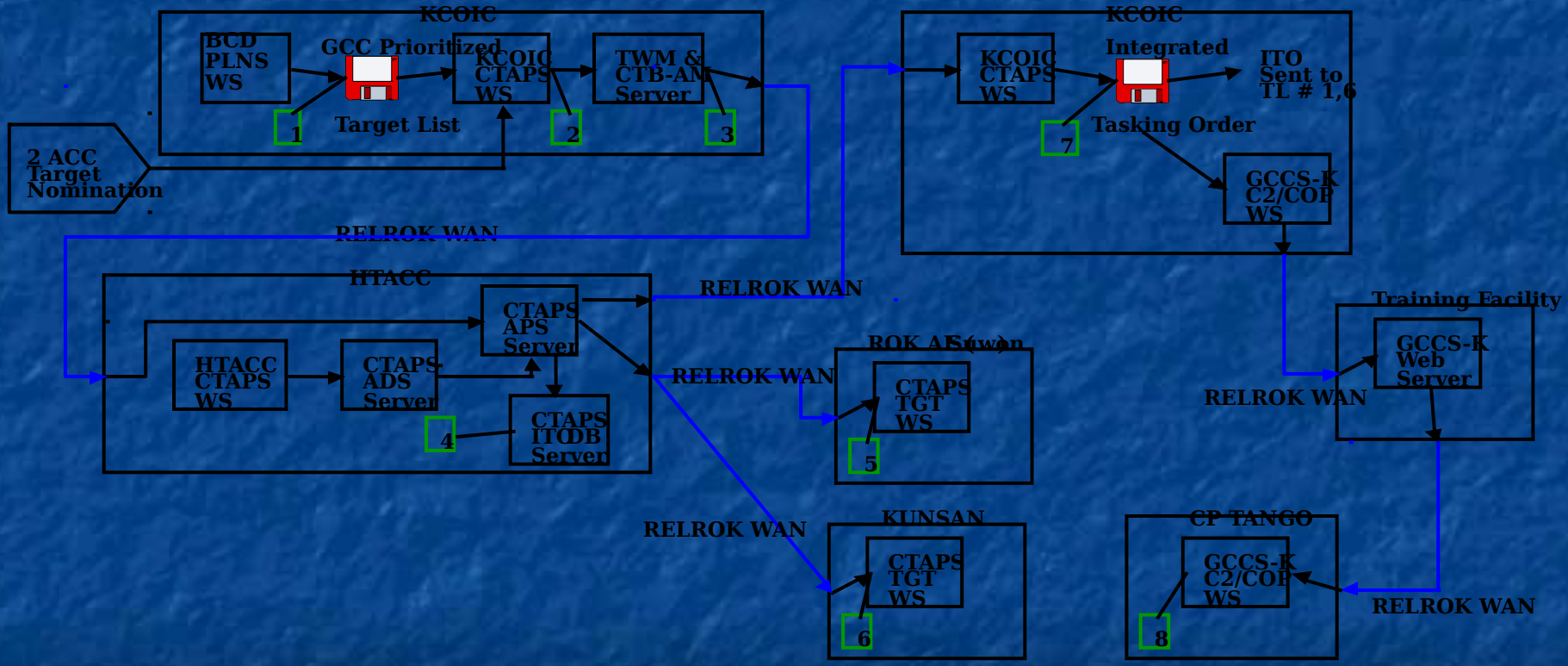


Mission-Focused Testing

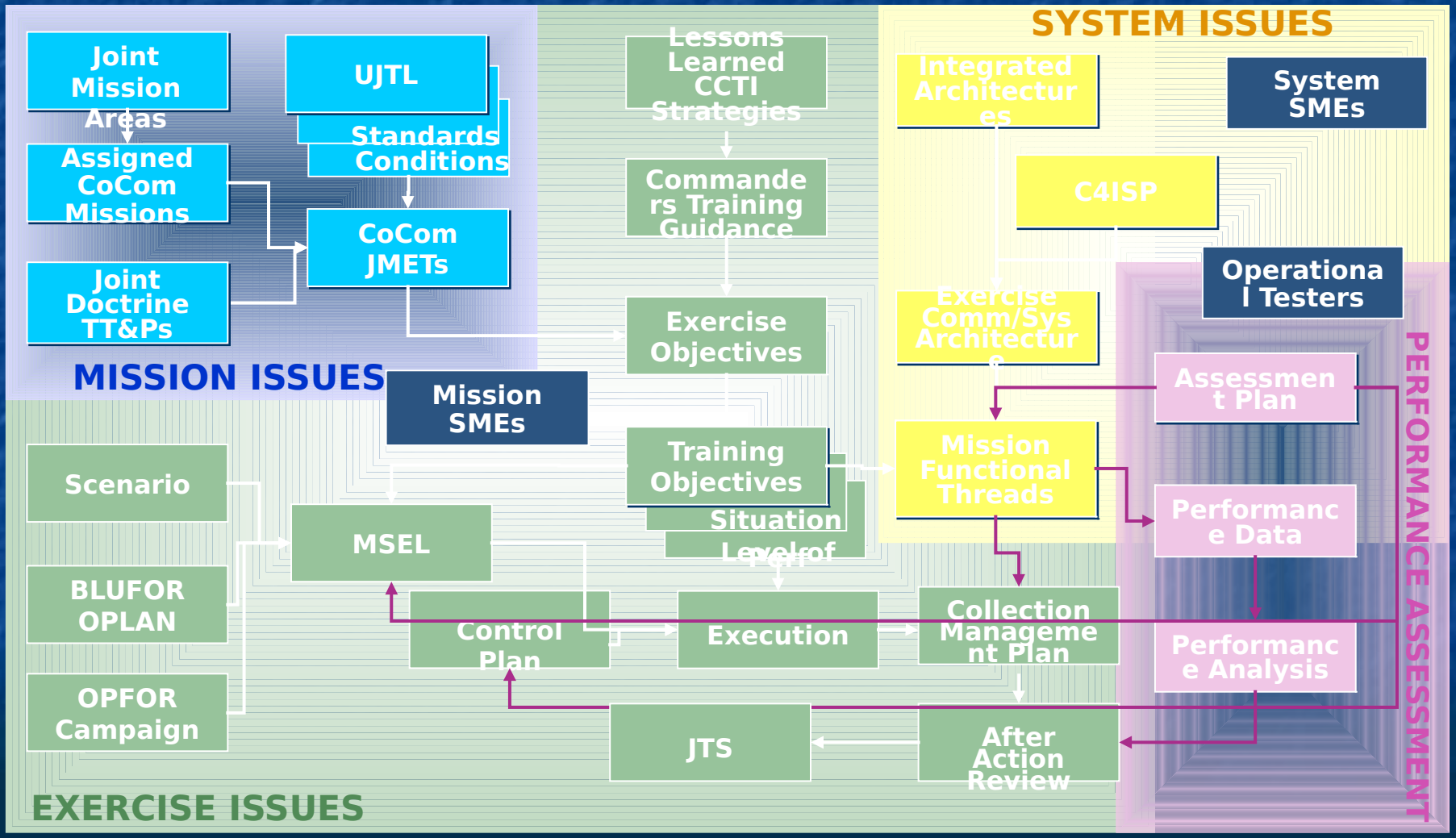


Example Mission Thread

(ATO Distribution)



Assessment Methodology Flow



QUESTIONS?